FEASIBILITY OF FARM-TO-SCHOOL IN ALASKA: A STATE-WIDE INVESTIGATION OF PERSPECTIVES FROM SCHOOL FOOD SERVICE PROFESSIONALS

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A

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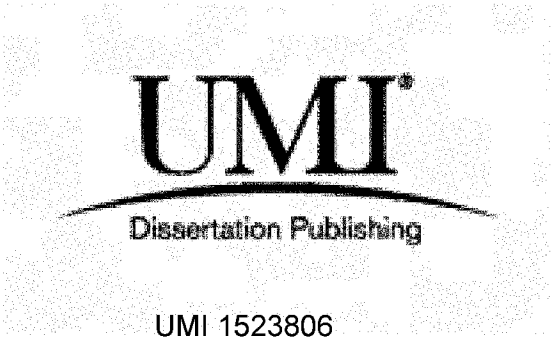

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Abstract

Childhood obesity is a significant public health concern and schools are a key setting for prevention. The majority of U.S. children are enrolled in school where they consume a large portion of their daily energy. Farm-to-school programs are a promising strategy for preventing childhood obesity in school-aged children. The overall objective of this study was to conduct a baseline assessment of Alaska school food service professionals' perspectives of using local foods. Specific objectives were to: 1) Assess interest in utilizing local foods, 2) Identify perceived barriers to purchasing local foods, and 3) Determine resources needed to facilitate local food procurement. A survey was administered to all school food service professionals in Alaska (n = 74) who oversee the National School Lunch Program in their program site or district. The survey consisted of open and close-ended questions, comprising six domains: interest, perceived benefits, perceived usefulness, perceived barriers, and future needs. Descriptive statistics were performed on all variables. The majority (80-96%) of school food service professionals reported interest in utilizing local foods in the school meal programs. School food service professional's reported concern with finding a reliable supply (67%) and the cost (46%) of locally sourced foods. Nearly all (92%) school food service professional's agreed that information about what foods are available, where to purchase them, and USDA purchasing regulations would be useful. Farm-to-school strategies are attainable in Alaska. Interest is high, and perceived barriers and challenges are consistent with national findings. The most useful resources identified could be accommodated through increased communication and use of existing resources.

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CHAPTER 1

Introduction

This thesis presents a baseline assessment of Alaska school food service professionals' perspectives on the procurement of local foods for Alaskan school meal programs. To do this, I developed a survey which was designed to understand Alaska school food service professional's interest in, perceived barriers to, and resource needs for utilizing local foods in school meal programs. The long-term objective of this project is to increase the use of local foods in the school food environment and, as a consequence, to curb childhood obesity. Collecting perspectives from school food service professionals is an important first step to accomplishing this objective.

This introduction discusses how farm-to-school programs can reduce obesity in school-aged children. It provides a brief review of current childhood obesity research, the school food environment, and farm-to-school programs. Figure 1.1 illustrates how farm-to-school fits into the broader children's food environment.

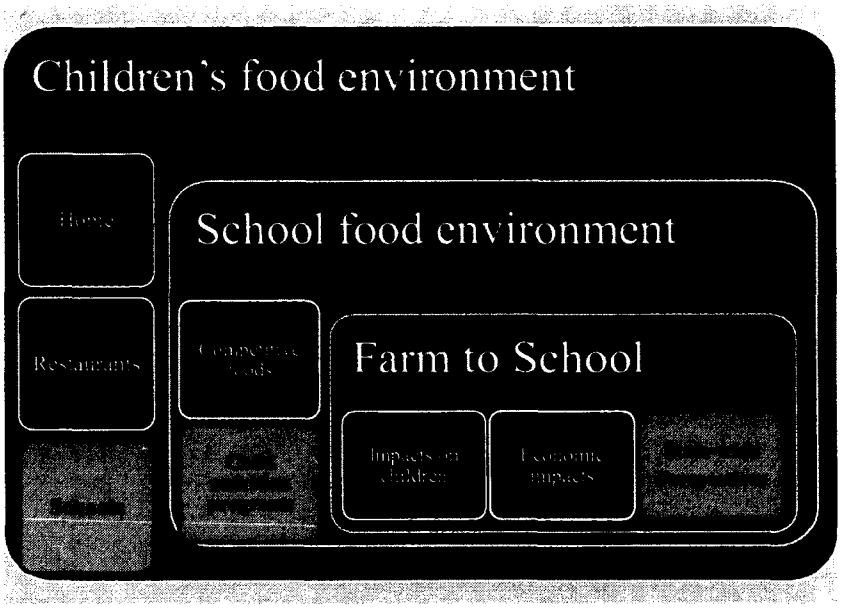

Figure 1.1: The relationship of farm-to-school and the children's food environment.

1.1 Defining Farm-to-school

Farm-to-school is broadly defined "as a program that connects schools (K-12) and local farms with the objectives of serving healthy meals in school cafeterias; improving student nutrition; providing agriculture, health and nutrition education opportunities; and supporting local and regional farmers."[1]

Farm-to-school programs offer promising strategies for preventing childhood obesity and increasing healthy eating habits in school aged children.[1-7] Farm-to-school programs showcase local foods in the school cafeteria while offering a range of complementary educational activities including garden-based learning, taste tests, culinary classes, and farm visits. Farm-to-school programs reinforce healthy eating in schools by aligning foods offered in the cafeteria with nutrition

education messages.[8] Farm-to-school research findings show positive impacts on children and economic development.

1.2 Childhood Obesity

Childhood obesity continues to be a public health concern despite recent reports of childhood obesity rates declining in some states.[9-18] The prevalence of childhood obesity nationwide more than tripled over the past four decades (from 5% to 17%) for kids aged 2-19 years.[15] In Alaska 25% of youth are overweight or obese, according to self report data among high school age students.[19] Childhood obesity has been linked to adult obesity, depression, and chronic diseases.[9-13, 20] In addition to these challenges, obesity imposes a financial burden to society; estimates of costs related to adult obesity were $99.2 billion in 1995 and increased to $147 billion in 2008.[14, 17] As a consequence of the high toll of obesity on both the individual and society, obesity prevention has become a priority, as witnessed through policy change and funding allocated to research.[21-23]

One factor contributing to high childhood obesity rates is diet quality. Nationally, many children have diets too high in energy and low in fiber, fruit, and vegetables.[24-26] According to a 2001 USDA report, between 60 and 80% of the diets of children aged 2 to 9 years were in need of significant improvement to meet USDA dietary recommendations.[25] Furthermore, CDC's Youth Risk Behavior Surveillance System reported more than 90% of adolescents consumed less fruits and vegetables than was recommended in the CDC *Healthy People 2010* report.[26]

Poor diet quality is influenced by a child's food environment which includes the home, restaurant, and school.[27-32] Each of these settings shapes a child's dietary patterns through the availability and accessibility of foods, social norms and interactions, and culture. For example, poor diet quality in a child's home food environment has been linked to television viewing, parental eating behaviors, and portion control.[33-34] Poor diet quality is also associated with children's increased total energy coming from fast food restaurants; energy consumption from fast food increased fivefold (2% to 10%) between the late 1970's to the mid 1990's.[35-37] A coordinated effort to improve *all* children's food environments is important. However, the school food environment is often targeted since it reaches a large number of children and can potentially be changed through policies.

1.3 School Food Environment

Schools and school meal programs are a key setting for childhood obesity prevention with approximately 50 million youth aged 5 to 19 years attending school. This estimate represents more than 80% of all youth in the United States.[38-40] As a result, childhood obesity interventions often target the school food environment as a place to educate and expose a large proportion of children to local healthy foods. The school food environment comprises both the federally regulated child nutrition programs, such as the National School Lunch Program, and other foods available at school, such as competitive foods. Competitive foods are "any foods sold in competition with [a federally reimbursable school meal program] to children in food service areas".[41-42] Research

about both competitive foods and child nutrition programs is important to understanding diet quality in the school food environment.

Most research that examines the school food environment is focused on diet quality and is best understood in conjunction with the history of child nutrition policy change. The diet quality observed in schools today can be viewed as the result of a number of policy decisions over the past several decades about foods available in schools.

1.3.1 Competitive foods and diet quality

Competitive foods were first permitted in schools in 1966 through National School Lunch Act amendments.[41-42] In 1972 vending machines with sodas became available in all schools when the National Soft Drink Association recommended an amendment to the National School Lunch Act eliminating restrictions for selling competitive foods at school.[42] Competitive foods were dominated by high calorie snack foods and soda in the 80's and 90's.[42-44] The increase in competitive foods has been linked to a decline in diet quality in schools.

National data shows that the competitive foods students typically purchase are high in calories and low in nutrients when compared to the Dietary Guidelines for Americans.[22,45] Several studies link competitive foods with excess calorie consumption and obesity among school-age children.[32, 46-48] For example, a study of middle school students in Kentucky found that students who purchase competitive foods tend to eat less of their lunch and consume more fat and fewer nutrients, compared to students who do

not.[47] Future research could examine the impact on children's diet quality when competitive foods are in line with Dietary Guidelines.

1.3.2 Child nutrition programs and diet quality

Child nutrition programs have existed for over 50 years, undergoing significant shifts in purpose to reflect current health concerns. Initially, child nutrition programs served as a solution to help feed the nation's youth and bring relief to struggling farmers. In 1966 Congress passed the Child Nutrition Act which established a Food Service Equipment Assistance Program, which provided school food service operations money to maintain and replace kitchen equipment. The Child Nutrition Act also increased funds for meals served to needy students. By 1969 President Nixon established free and reduced-price lunches in an effort to end hunger in America.

In 1981 President Reagan cut the child nutrition program budget which dropped 2 million children from the program and eliminated the $10 million Food Service Equipment Assistance Program. As a result, school food service operations moved away from cooking from scratch and toward use of more prepared foods.[42-43] Today, "heat and serve" kitchens are ubiquitous. Changes in policy during the 1980's can be linked to many of the challenges school food service professionals face today: lack of equipment to prepare foods, a decrease in funding to the meal programs, and an increase of low quality foods in the school food environment. These challenges may be a barrier to farm-to-school programs that often use locally produced foods direct from the farm.

In the 1990's the quality of school meals and competitive foods gained attention as a possible association with childhood weight gain.[42] A national study from 2009 showed that, relative to the 2005 Dietary Guidelines for Americans, two-thirds of US schools were not meeting the standards for energy from fat, or saturated fat, sodium, and fiber.[49] A study conducted in Mississippi confirmed these findings.[50]

Over the years policy change in federal child nutrition programs has reflected current health concerns. Currently, child nutrition programs are responding to concerns related not only to the nation's health, but also to the health of the environment. Support for farm-to-school programs in the federal mandate, Healthy Hunger Free Kids Act of 2010, is a salient example of a policy change that addresses public and environmental health concerns.[43]

1.4 Farm-to-School has Positive Impacts on Children

Farm-to-school is a promising obesity prevention strategy because of its multi-level approach: addressing individual behaviors as well as higher levels of change such as access to local healthy foods and changes in policy. A growing body of literature demonstrates the positive impact farm-to-school programs have on child eating habits, attitudes toward healthier foods, and their connection to their food system. When farm-to-school strategies are used to complement changes in the school food environment children are more likely to be receptive to the changes and see the impact extending beyond school. In addition, farm-to-school programs have the potential to have a positive economic impact on producers and schools.

1.4.1 Peer-reviewed research

Peer-reviewed literature on farm-to-school research is limited, but growing. The majority of this research focuses on garden based education, a key farm-to-school strategy that teaches educational lessons using a school garden.[7, 51-53] Garden-based education has been shown to increase student preference for, knowledge of, and consumption of fruits and vegetables among elementary and middle school aged students. Findings that link garden based education and positive impacts on students are consistent across grade levels, school settings (traditional versus summer programs), and geographic locations.[7,51-53] These studies suggest that students will be more receptive to fruits and vegetables served in school meals if they participate in hands-on experiences, such as garden based education efforts.[7]

However, garden based education is only one strategy of farm-to-school programs. Research that evaluates the educational effects of other farm-to-school activities, such as farm tours or classroom lessons, also find positive impacts on students' learning, knowledge, preference for, and consumption of fruit and vegetables.[54-56] Improvements are especially pronounced when the program has been in place for multiple years,[2, 56-57] suggesting that the impact of farm-to-school programs may take several years to manifest. Improving children's eating habits is a tactic for obesity prevention.

1.4.2 Research from case-studies

Much of what is known about the positive impacts of farm-to-school programs comes from evaluations of case studies. Although these evaluations were not peer-reviewed

they contribute critical information that can serve as the basis for hypothesis generation and further research.

An evaluation of four farm-to-school programs in 2010 found benefits to children as well as the school meal programs.[58] Each farm-to-school program participating in the evaluation included activities connecting classrooms, cafeterias, local farms, and communities. Evaluation results from one site found that after the farm-to-school program had been implemented there was an increase in cooking from scratch in kitchens, school meal participation, and access to local foods for all schools in the district. Evaluation results from two of the sites found an increase in student consumption of fruits and vegetables and positive feedback from involved stakeholders for the program.[57] Other evaluation findings included improvements in the quality of cafeteria food, introduction of new foods and preparation methods, and financial support of the school district for the farm-to-school programs. In addition to finding positive impacts on an individual level these results show strategies being adopted in the school food setting and district policy level which will improve the likelihood of obesity prevention.

Another evaluation, conducted by the Community Food Security Coalition in March of 2010 compared four farm-to-school programs[59] that were working to expand their existing programs. The study followed each program for three years and found that, as a result of the farm-to-school programs, there was an overall increase in local food sales from $173,000 in the first year to $4,671,210 in the third year. At the highest point there was a 50% increase in local food served to students. These case studies support the idea

that farm-to-school programs can further a broad range of goals — from improving child diet quality to generating additional revenue for local producers through the sale of local foods.

Finally, in July of 2011, the USDA published the *2010 Summary Report* of the USDA farm-to-school team.[60] During 2010, the USDA farm-to-school team visited 15 school districts that were involved in farm-to-school activities. Four significant lessons were identified: 1) communities had to work hard to overcome challenges specific to their programs, 2) open and clear communication among stakeholders was critical for success, 3) the USDA *Know Your Farmer, Know Your Food* initiative provided credibility to local efforts, and 4) insufficiencies in the local supply chain often presented challenges for farm-to-school efforts. Five primary needs were identified: financial support, clear understanding about USDA's child nutrition program procurement requirements, development of farm-to-school stakeholder networks, increased awareness of existing USDA efforts that support local and regional food systems, and evaluation systems to measure the impact of farm-to-school programs.

1.5 Farm-to-School has Positive Economic Impacts

An applied economic analysis was conducted in 2009 in the Region Five District, located in north central Minnesota, to study the complex relationships between producers and consumers to help predict economic effects regionally.[61] The Region Five District has approximately 26,000 students and is home to five counties. The study compared different models of local food utilization and the potential economic impacts on local

farmers: incorporating local food into a monthly special meal, incorporating local foods that would not require any processing, or incorporating all local food available (processed or unprocessed). Potential annual economic impact of farm-to-school programs on farmers ranged from $20,000 to $427,000 depending on the utilization model.[62] Findings from this study were mixed. The models that demonstrated the lowest economic effects were easy to implement and good for programs just starting out. The models that demonstrated a high economic impact to farmers may not be economically feasible for schools, even though they would positively impact the farmers and local economy. These results indicate the need to better understand the economic impacts farm-to-school models, especially on models that are more likely to be implemented.

In another exploration of the economic benefits of farm-to-school, researchers evaluated the impact of allocating $0.07 per meal toward procuring local foods and local economic development during the 2008-2009 school year in two Oregon school districts.[63] Results showed, in six different scenarios that reflected school spending behaviors, the state could expect immediate benefits across multiple sectors of the Oregon economy. For example, the most conservative scenario showed that a $9,790,000 investment from the state would result in an economic output of $17,947,070 and employment of 159 people. Alaska recently appropriated state funds for school districts to purchase local food, creating an opportunity for research that examines the economic effects at a state-wide level as well as trends in spending behavior.[64]

1.6 Farm-to-school Informed by School Food Service Perspectives

A key component of farm-to-school programs is local food procurement by school food service professionals. School food service professionals oversee school meal operations and are often in charge of meal planning and/or food purchasing. Existing research on school food service professionals' perspectives about farm-to-school is primarily done on a state-wide level. State-wide research has been mostly exploratory, gathering information about perspectives of school food service professionals' on the potential farm-to-school. Formative research helps ensure the effectiveness of farm-to-school programs. The impact on obesity prevention may take time to notice but change in the school food setting is important for increasing access of local foods to children.

A common entry point for local foods is the National School Lunch Program, run by school food service professionals. The National School Lunch Program is the largest child nutrition program administered by the USDA, a key objective of which is to ensure that children have access to healthy, well-balanced meals.[44, 65] More than 101,000 US schools participate in National School Lunch Program (99% of all public schools and 83% of all public and private schools combined).[66] In 2008 the National School Lunch Program served an average of 30.9 million students a day and over 5 billion lunches annually, satisfying one-third of their daily needs for a variety of essential vitamins and minerals and 35% of their total daily energy intake.[32, 65, 67] School food service professionals may oversee more than one child nutrition program but the National School Lunch Program is by far the largest and most common.

1.6.1 Existing state-wide research

Five state-wide studies gathered perspectives from school food service professionals in agriculture-rich regions of the nation.[8, 68-71] In each of the state-wide studies, school food service professionals indicated they were interested in utilizing local foods but also reported a number of barriers to incorporating local foods in the meal programs.

A 2002 study conducted in California examined the concerns faced by farms and schools interested in purchasing through farm-to-school programs.[71] Approximately half of the school food service professionals surveyed purchased food directly from farms. The leading reasons that motivated school food service professionals to buy locally were access to fresher food and the potential to support the local economy/community. The leading perceived barriers to purchasing local produce were cost and vendor/delivery considerations. It is unknown whether school food service professionals who purchased directly from farms faced similar problems with cost compared to school food service professionals who purchased local food through vendors.

A survey was administered to school food service professionals in Oklahoma to assess their practices and preferences related to purchasing locally produced and processed foods.[69] Results indicated that 66% were interested in purchasing local and 25% were already purchasing local. School food service professionals were motivated to purchase local food to support the local economy and farmers as well as by gaining access to fresher product. The leading concerns reported were about food safety, cost, a lack of producers to buy from, seasonality/availability, and quality. It was unknown whether the

capabilities of local food producers could meet the needs of school food service professionals.

Another survey was administered in 2008 to gauge the interest of Minnesota's K-12 food service directors in serving locally grown food.[70] Results showed that 35% of respondents purchased local food directly from local farmers and 20% purchased local food from a vendor. Nearly all the participants that purchased direct from local farmers reported a positive experience. Overall interest in purchasing local foods was high, with 63% responding they were very interested in purchasing local foods. Motivations for purchasing locally were to support the local economy and business, to improve public relations, and to increase students' consumption of fruits and vegetables. Implications from this research are that purchasing local foods directly from the farmer is going well. Future research should examine the benefits and challenges of direct purchasing versus going through a vendor.

In 2004, a study was conducted to investigate Michigan school food service directors' interest in and opportunities and barriers to implementing a farm-to-school program.[8] Key findings were that 10.6% had already purchased local foods. In addition, 73% were interested in purchasing directly from farmers and 83% were interested in purchasing through current vendors. Motivations for purchasing local food were to support the local economy and access fresher and higher quality foods. The top purchasing concerns reported were cost, seasonality, and food safety. School food service professionals were more interested in purchasing through current vendors but the majority showed interest in

direct purchasing as well. Future research should follow up with an examination of school food service professionals that do purchase local foods to see if concerns are verifiable.

The final study collected data from school foodservice managers in four Midwestern states: Iowa, Kansas, Nebraska, and Minnesota.[68] This study intentionally selected states that had a strong agricultural economy. The top perceived benefits reported were good public relations and aiding the local economy. The top perceived barriers reported were concerns about year-round availability, adequate supply for volume, and reliability of supply. Stratifying these results by state, or proximity to local agriculture, is needed to understand whether the feasibility of implementing a farm-to-school program differs by school and/or district location.

To date, published studies that investigate school food service professionals' perspectives on local food procurement have been conducted in settings that have access to a large variety of agricultural products and are in close proximity to farms.[8, 68-69, 72-75] In combination, these studies suggest that interest in farm-to-school programs is high in these states. Cost and reliable supply are consistently reported as barriers to implementing a farm-to-school program. School food service professional's perspectives of serving local foods in school meals have yet to be explored in rural regions with limited access to agriculture, such as Alaska.

1.7 Farm-to-School and Alaska

Farm-to-school programs have the potential to make a long-term positive impact in Alaska, where 25% of youth are overweight or obese.[19] Alaska has a short but strong growing season, is bountiful in seafood, and many residents have strong cultural ties to local food. Alaska faces a number of unique challenges yet there is also unique opportunity and potential for success.

This thesis surveyed Alaskan school food service professionals to understand their perspectives on serving local foods in school meal programs. Specific objectives were to: 1) assess school food service professionals' interest in utilizing local foods in the school meal programs, 2) identify perceived barriers of purchasing local foods, and 3) identify resources needed to facilitate local food procurement. This study builds on previous research by understanding the perspectives of school food service professionals in a non-agriculture-rich state, where local food purchasing is difficult due to the size of the state and distances between districts, lack of a road system, limited farming season, and small populations.

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CHAPTER 2

Feasibility of Implementing Farm-to-school in Alaska: School Food Service Professionals Perspectives[1]

2.1 Abstract

Objectives: This study assessed perspectives of Alaska School Food Service Professionals (SFSPs) for: 1) interest in using local foods in the school meal programs, 2) barriers to purchasing local foods, and 3) resources needed for local food procurement.

Method: A survey was administered to all Alaska SFSPs (n= 74) who were in charge of a USDA Lunch Program. Descriptive statistics were performed on all variables and compared to other state-wide assessments of SFSPs.

Results: Nearly all of SFSPs reported interest in locally sourced products. SFSPs reported concern about reliable local supply (67%) and cost (46%). Most (92%) agreed that information about what foods are available, where to purchase them, and USDA purchasing regulations would be useful.

Conclusions and implications: Alaska SFSPs report high interest in implementing farm-to-school strategies. Interest is high, perceived barriers and challenges are consistent with national findings, and the most useful resources identified could be accommodated through increased communication and use of existing resources.

1 Herron, J and Bersamin, A. Feasibility of Implementing Farm-to-school in Alaska: School Food Service Professionals Perspectives. Prepared for *Journal of Nutrition Education and Behavior.*

2.2 Introduction

2.2.1 Background

Childhood obesity continues to be a public health concern. National obesity rates have more than tripled over the past several decades.[1] Childhood obesity has been linked to adult obesity, depression, and chronic diseases.[2-7] Ethnic minorities and rural populations are disproportionately affected by childhood obesity.[8-10] The importance of obesity as a health concern is highlighted by the increase in obesity related policy changes and increased funding for obesity prevention research.[11-13]

Schools are a key setting for obesity prevention since the majority of U.S. children are enrolled in school and schools provide one-third or more of the total energy intake of students participating in child nutrition programs.[14-18] The National School Lunch Program serves 5.5 billion lunches annually, feeding 31.5 million children daily.[19-20] More than 101,000 US schools, which represents 99% of all public schools, participate in the National School Lunch Program.[21] Schools have an important opportunity to reinforce healthy eating by aligning cafeteria food choices with nutrition education messages.[22] Farm-to-school (FTS) programs are a powerful way to integrate the school food environment and nutrition education and may be a promising strategy for preventing childhood obesity and increasing healthy eating habits in school aged children.[23-28]

FTS is broadly defined as a program that connects schools (K-12) and local farms with the objectives of serving healthy meals in school cafeterias, improving student nutrition, providing agriculture, health and nutrition education opportunities, and supporting local

and regional farmers.[29] Across the nation, farm-to-school programs promote healthy food choices by featuring local foods in the cafeteria and teaching children about where food comes from through nutrition education and hands-on activities.[30-31] Research about farm-to-school activities reports increased knowledge about and consumption of fruit and vegetables among children.[31-33] Improvements are especially pronounced when the program has been in place for multiple years.[23, 34-35] Farm-to-school research has also reported that these programs result in improvements in the quality of foods offered in the cafeteria, an increase in cooking from scratch, and increases in student knowledge of the local food system.[33]

Farm-to-school programs often begin by serving locally produced foods in the school cafeteria. School cafeterias are managed by school food service professionals (SFSPs), who provide a key perspective for understanding local food procurement challenges and taking the initial steps toward building a farm-to-school program.[22, 36-41] Understanding the perspectives of SFSP's regarding using local foods in school meal programs is a critical starting point for developing a viable farm-to-school program.

To date, published studies that investigate SFSP's perspectives on local food procurement have been conducted in settings that have ready access to a large variety of local agricultural products and farms.[22, 42-48] Moreover, most of these studies focus on local produce, and little is known about perceptions of procuring alternative local foods. Alternative local foods could include grain, dairy, livestock, wild game or seafood.

This study investigated attitudes of SFSPs to FTS strategies in Alaska. The state of Alaska is comprised primarily of rural areas with little to no access to year-round farming. This Alaska-based study responds to the need to understand perspectives on implementing farm-to-school programs in a setting where access to local agricultural is limited by a short growing season, the number of producers, and proximity to agricultural production. Exploring the feasibility of, and interest in, implementing a farm-to-school program in a remote, primarily rural, state like Alaska is essential to understanding the transferability of this approach.

2.2.2 Alaska context

In Alaska, vast distances between schools and school districts, a limited road system, and the short growing season create major challenges for food distribution and access to local foods, particularly from producers who are new to the school food market. Additionally, Alaska is the largest state in the United States with over half (59%) of the population residing in small, rural, and geographically remote communities.[49-50]

According to the School Food Purchase Study-III, Alaska school districts fall into three categories: small, medium, and large.[51] The large district was defined as a major metropolitan area, the medium districts were considered other major population centers, and the small districts were those not categorized as large or medium. A total of 48 small districts account for 92% of the school districts, yet these districts only account for 27% of the total state student enrollment. Three medium districts (6%) account for 32% of the state student enrollment, and one large district accounts for 40% of the total state student

enrollment.[51] Variation in district size has significant implications for purchasing power and food availability. Purchasing power of the large district determines what food is available to the small districts, unless the medium-sized districts work cooperatively to create other options.

Alaska has a shortened farming season, due to long winters, and a limited supply of "in season" foods, making local food procurement during the calendar school year a challenge.[51] Alaska has only two commercial-sized produce farms; potatoes and carrots are currently the only two vegetables that are in large supply most of the year (Pettit A, personal communication, 2012). Processing capabilities, which help to increase foods that are 'ready to use' (i.e. flour or shredded cabbage), are also limited in Alaska. Alaska has two produce processing facilities, four USDA-inspected livestock processing facilities, two dairy farms, one commercial flour mill, yet it has hundreds of fish processing facilities (Pettit A and Lhotka L, personal communication, 2012). Although Alaska has a limited farming season, milk, fish, grain, and livestock are all available year round and have the potential to supply schools these items throughout the school year.

This study surveyed Alaska SFSPs about their perspectives of a key farm-to-school strategy: utilizing local foods in the school meal programs. Our specific objectives were to: 1) assess SFSPs interest in utilizing local foods in the school meal programs, 2) identify perceived barriers to purchasing local foods, and 3) identify resources needed to facilitate local food procurement.

2.3 Methods

2.3.1 Study design

This study was a census survey that targeted the entire population of interest. We administered a state-wide survey to all SFSPs (n= 74) in Alaska who were in charge of a site that participated in the National School Lunch Program. SFSPs from each of the six regions of the state (interior, Kenai Peninsula, northern-arctic, south central, southeast, and southwestern) were represented. To increase question relevancy and clarity, the survey was reviewed by an advisory panel, composed of 18 members offering expertise in public health, nutrition research, food service, survey development, and school wellness. The study protocol was approved by the University of Alaska Fairbanks Institutional Review Board.

2.3.2 Participants and recruitment

All food service professionals in Alaska from districts that participate in the national school lunch program (n=74) were invited to complete an online survey (response rates given below under results). SFSPs were defined as the people who do the majority of the meal planning and food purchasing for the district or school. A contact list of SFSPs was provided by the state Department of Early Education and Early Development, Child Nutrition Program. Each SFSP was contacted by phone. Participants were informed about the project, verified as the correct person to participate, and asked if they preferred an electronic or a hard copy survey.

2.3.3 Measures

The survey consisted of open and closed-ended questions that were developed from a review of the literature on the school food environment, discussion with leaders of state child nutrition programs, published surveys, and input from an advisory panel.[39, 44, 52-53] Survey questions focused on assessing SFSPs interest in and motivation for using local foods in the school meal program. SFSPs were asked about the importance of eight purchasing practices and how concerned they were with four purchasing considerations. The survey also asked about potential barriers to using local foods and about the usefulness of a number of resources to facilitate their use. To improve face validity, the survey was pilot tested with multiple food service professionals in Alaskan institutions that were not part of the school system. Feedback about wording, question flow, and aesthetics from both the advisory panel and the pilot participants were incorporated into the survey before it was finalized.

2.3.4 Procedure

To maximize response rate, the survey was administered with a modified version of Dillman's internet and mail survey methodology.[54] Electronic and hardcopy surveys were administered to all participants using Survey Monkey. After two weeks, a reminder email was sent to non-respondents; those who did not reply after four days were then sent a hard copy of the survey. A final reminder was sent two weeks later to the remaining non-respondents.

2.3.5 Data analysis

Descriptive statistics were run on each variable. Data were analyzed using SPSS grad pack version 18.0.[55]

2.4 Results

A high response rate (72%) was achieved with 53 SFSPs completing the survey, 10 filling out the hard copy and the remaining 43 filling it out electronically. Demographic characteristics of the participants are shown in Table 2.1.

Table 2.1: Survey participant characteristics.

Characteristics	**(N)**
Gender	
Females	30
Males	19
Position duties	
Menu planners	46
Food purchasers	49
Region of State	
Interior	10
Kenai Peninsula	2
Northern – Arctic	4
South Central	7
Southeast	17
Southwestern	10

2.5 Interest

SFSPs were asked how interested they were in incorporating five Alaska foods or food categories into their meal planning: salmon, other fish, game (e.g. moose and caribou), berries, and produce. These five food categories were selected after discussion with the advisory panel about the most common and likely local foods to be served in Alaska school meals. The survey also included an option to add foods not listed. Virtually all SFSPs (96%) reported either already using Alaska foods, or having a high level of interest in using at least one Alaska food or food category (Figure 2.1). SFSPs were already using or were most interested in produce and other Alaska fish (96%). Although still high, SFSPs expressed the least interest in using game (80%).

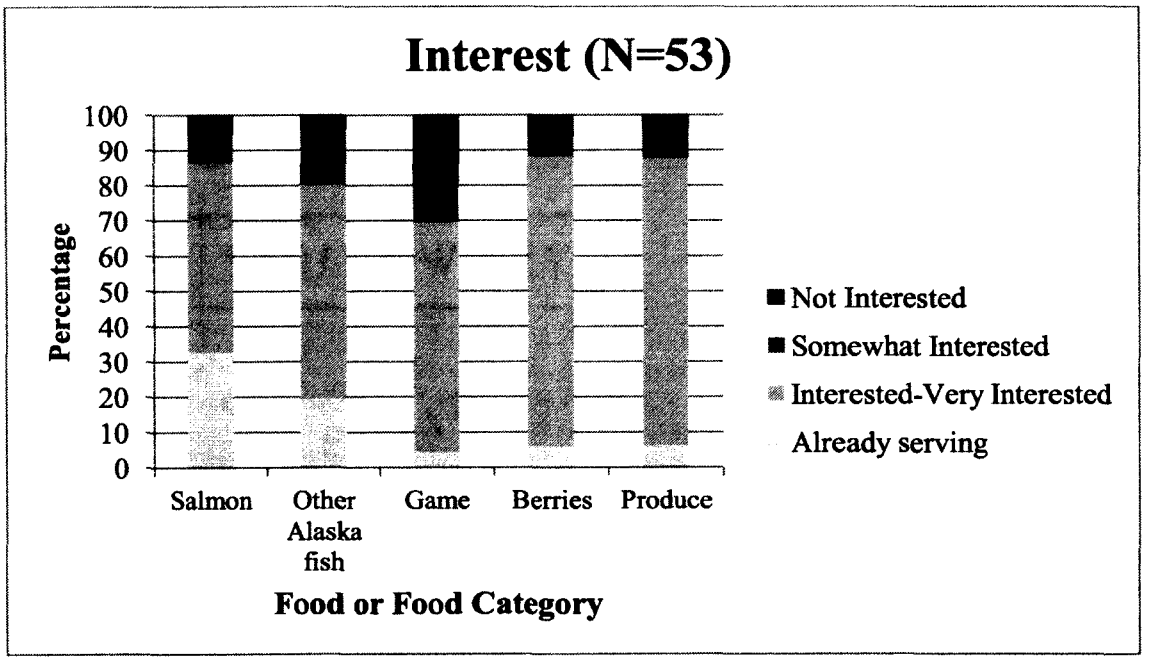

Figure 2.1: School food service professional's interest and use of five Alaska foods or food categories.

2.6 Barriers and Challenges

2.6.1 Importance of purchasing practices

Almost all SFSPs agreed that reliable supply, purchasing choice consistency, cost, and delivery considerations were "important" or "very important" when purchasing Alaska foods ($\geq$ 92%). The majority (75%-87%) of SFSP's also reported that package consistency, ordering method, and payment arrangements were "important" or "very important".

2.6.2 Concern with purchasing considerations

Three-quarters (75%) of SFSPs were "concerned" or "very concerned" with finding Alaska producers in the area from whom to purchase food. Over half (54-66%) of SFSP's were "concerned" or "very concerned" with a lack of facilities and staff to handle fresh Alaska foods and losing the convenience of one-stop shopping.

2.7 Future Needs

As seen in table 2.2, 80% or more of the SFSPs rated ten of the fourteen tools or resources as "useful" or "very useful" for helping them increase use of Alaska foods in their school meal program. The top five useful tools and resources reported were: 1) information on foods available and where to purchase them (92%), 2) information on USDA purchasing regulations related to Alaska foods (92%), 3) financial support (90%), 4) Alaska food products that are clean & ready to use (88%), and 5) cost comparisons for Alaska and imported menu options (88%).

Table 2.2: School food service professionals responses for resource or tool needs.

Resource or tool list	% responding the listed resource would be 'useful' or 'very useful'
Info. On foods available and where to purchase.	92%
Info on USDA purchasing regulations related to Alaska foods.	92%
Financial support.	90%
Alaska food products that are clean & ready to use, pre-cut etc…	88%
Cost comparisons for Alaska and non- Alaska menu options.	88%
Strategies for connecting with Alaska food producers.	86%
Educational resources about the nutritional benefits of Alaska foods.	86%
Recipes using Alaska goods.	84%
Menu ideas and menu substitutions.	82%
Connecting with districts that are successfully incorporating Alaska foods.	80%
Skills training on inspecting and accepting donated foods.	70%
In-person training on Alaska food processing (CEU credit).	68%
Online training modules and resources.	67%
Marketing tools about Alaska foods for parents, staff, media, etc…	60%

2.8 Discussion

This study surveyed SFSP's perspectives on using local foods in the school meal programs in Alaska. Purchasing local food in Alaska is difficult due to the distances between districts, limited road system, and short farming season. Despite these challenges, Alaska SFSPs reported being equally interested in procuring local food as SFSPs in agriculture rich states, indicating there is potential for farm-to-school implementation.[22, 42-48]

Alaska SFSPs identified a number of barriers to serving local foods in school meals that have previously been reported by SFSPs in other states.[22, 24, 39, 44, 53] Alaska SFSPs leading concern for serving local foods in the school meal program is accessing a reliable supply, whereas this is only the second or third most important concern reported in agriculture rich states such as Michigan and Oklahoma.[22, 24, 26, 39, 44, 48, 53] Reliability may be of concern in Alaska due the small number of farms and the disconnect between the growing season and the school calendar year. Reliable supply could also be of concern because SFSPs may associate local food with produce as opposed to other, more plentiful foods in the state such as fish. One solution to the potential lack of a reliable supply may be to utilize foods within the state that are available year round; such as grain, milk, game, and fish. Alternatively, there may also be opportunities to utilize techniques that extend the growing season; such as freezing harvested foods and increasing storage capacity.

Alaska SFSPs were also very concerned with the high cost of local foods, as are SFSPs in other states.[22, 24, 44, 56] The cost of food in general tends to be much higher in Alaska

compared with other regions in the U.S. due transportation costs and energy costs.[57] It is unknown however, whether local foods are particularly costly relative to non-local foods. Although previous consumer market research has shown that local produce prices are almost always lower than non-local produce prices, no research has been conducted comparing the cost of non-agricultural produce items like livestock and fish. This may yield very different results. It is possible that in Alaska some local foods may cost more due to increased prices for energy and transportation for farming supplies (e.g. fertilizer and equipment).[58] Additional research about cost comparisons of local and non-local foods would help bring more definitive results to share with SFSPs nation-wide.

SFSPs also reported concerns about staffing, lack of equipment to process local foods, and having ready-to-use food. Ready-to-use foods are also known as "value-added," which usually cost more than unprocessed product. Using unprocessed foods may be viewed as a good financial choice by the average consumer, but from the perspective of SFSPs, it may translate to financial burden when labor dollars and equipment are taken into consideration.

Alaska SFSPs identified several resources and tools that would help facilitate the utilization of local foods in their school meal programs, most of which would require little financial investment, such as information about regulations. Only one other study reported what resources and tools would be useful for helping SFSPs utilize more local products. The top five resources identified agreed with the results of this study, three of which were for more information (e.g. strategies, USDA regulations, and cost

comparisons).[53] We found that such resources were available from a variety of agencies or programs, such as the Division of Agriculture or Cooperative Extension Services. Therefore, increasing communication between these existing programs and SFSPs has the potential to move farm-to-school program implementation forward with minimal investment of time or money.

2.9 Limitations

Our sample size was small which precluded stratifying our analyses by a number of characteristics, principally district size and student enrollment, which may influence the feasibility of implementing a farm-to-school program. For example, school district size ranged from one to eighty schools and school district student enrollment ranged from 53 to nearly 50,000 students. The majority of the survey respondents (83%) oversee a program that serves student population under 2,000; incidentally survey results favor the viewpoint of the smaller districts and facilities. It is possible that interest in, and barriers to, serving local foods differs by district size, student demographics, and location. For example, medium and large size districts utilize central kitchen facilities while the remainder of the state does not. Barriers to serving local foods may be addressed in Alaska differently in districts that make large quantities of meals from a central kitchen facility than they are in districts that make meals in smaller quantities using on-site school kitchens.

While we were unable to stratify the results, our response rate was high and a state-wide understanding is important to inform state policy makers about ways to help support SFSPs in their efforts to incorporate more local foods into the school meal programs.

2.10 Implications for Research and Practice

Implementation of farm-to-school in rural states with a limited farming season can be a feasible childhood obesity prevention strategy as long as local and regional barriers are understood and considered. Rural communities need to focus on the strengths of their local food system, both in the meals they offer and in the educational approach in the classroom. Implementing farm-to-school strategies that emphasize alternative local foods (i.e. non-agricultural foods) may require overcoming the need for additional equipment, staff training, or outside processing. Educating students about local foods served in the school cafeterias may also require a creative approach, with an emphasis on lessons that focus on local foods other than produce or use of indoor school gardens.

As schools adopt strategies for addressing the prevalence of childhood obesity, farm-to-school programs will continue to be looked to as a "win-win" option for teaching children where their food comes from, supporting the local economy, and promoting positive environmental practices. This study provides support for farm-to-school as a strategy to support healthy eating that can be utilized in any setting, even rural states with limited agriculture.

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CHAPTER 3

Conclusion

Farm-to-school has been shown to have a positive impact on children and communities in areas with an abundance of agriculture. This thesis provides evidence that farm-to-school is also feasible in rural communities that have limited access to agriculture (see appendix for survey questions). That farm-to-school is a promising approach to promote healthy eating in rural communities is important given the disproportionately high levels of obesity in these communities.

Farm-to-school in settings with limited agriculture should explore local food options that are abundant throughout the year. Supply considerations are a concern for school food service professionals which could be attributed to the common perception that local food is referring to agriculture instead of more abundant food sources. Barriers can be addressed by focusing on the resources that would require minimal time or financial investment.

Alaska school food service professionals indicate that they are interested in using more local foods. Initial steps that can be taken in Alaska could provide information to school food service professionals and explore viable local food options. Future research should focus on the feasibility of local food sources that are plentiful throughout the year and the economic impacts of using those foods. Other research could focus on the impacts of complimenting the local food efforts in the cafeteria setting with educational efforts in the classroom. Despite seasonal challenges, farm-to-school in Alaska looks like a

promising strategy for increasing local food options in school cafeterias, promoting healthy eating and ultimately addressing childhood obesity.